The Fundamental Structure of Coronal Loops

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High Resolution Coronal Imager (Hi-C)

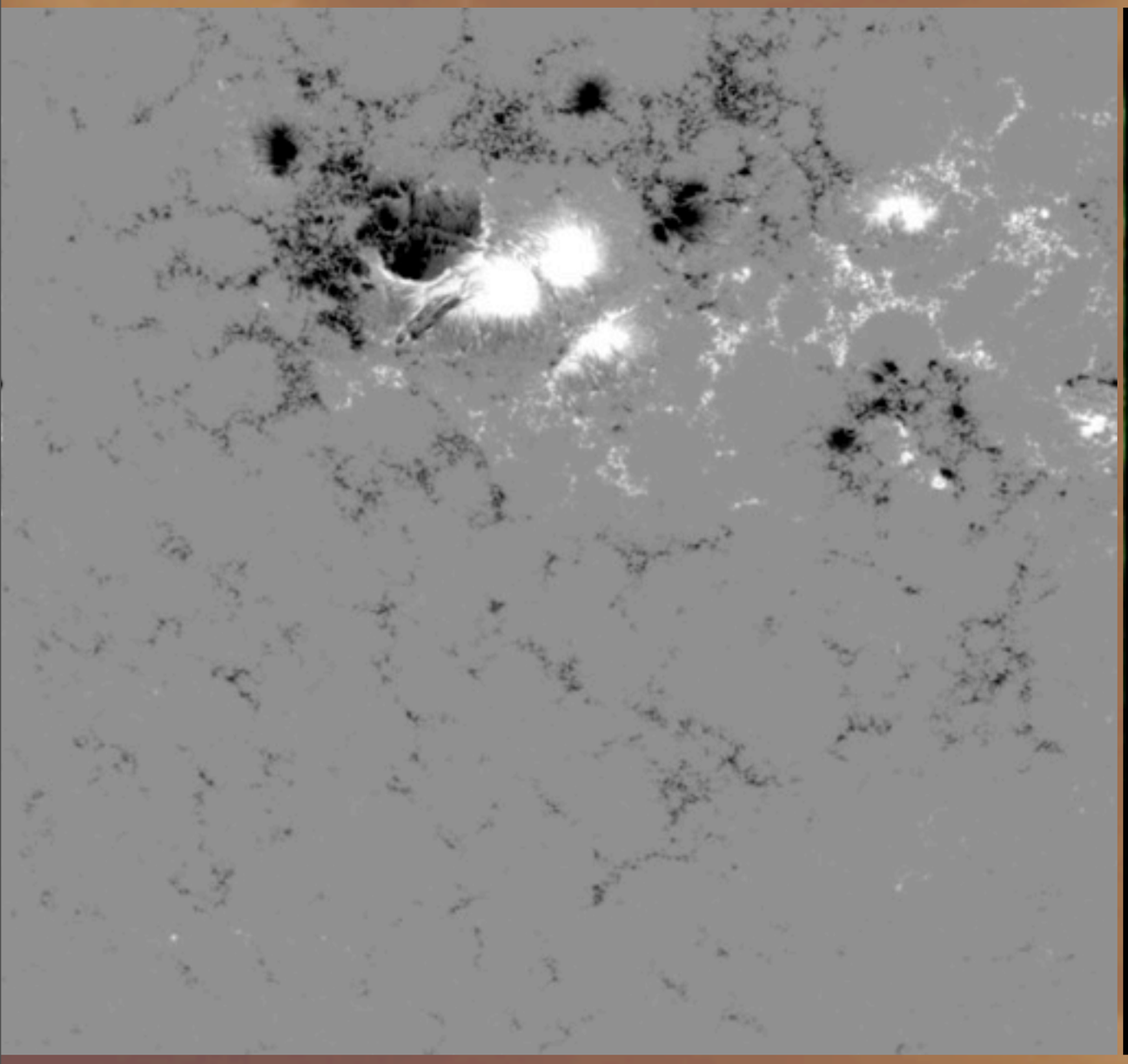
- Flown on a sounding rocket from White Sands on July 11, 2012
- Observed AR 11520 for ~ 5 minutes
- 193 Å channel
- 0.1” pixels, ~0.25” resolution
- 6.8’ x 6.8’ field of view
- 5.4 s cadence

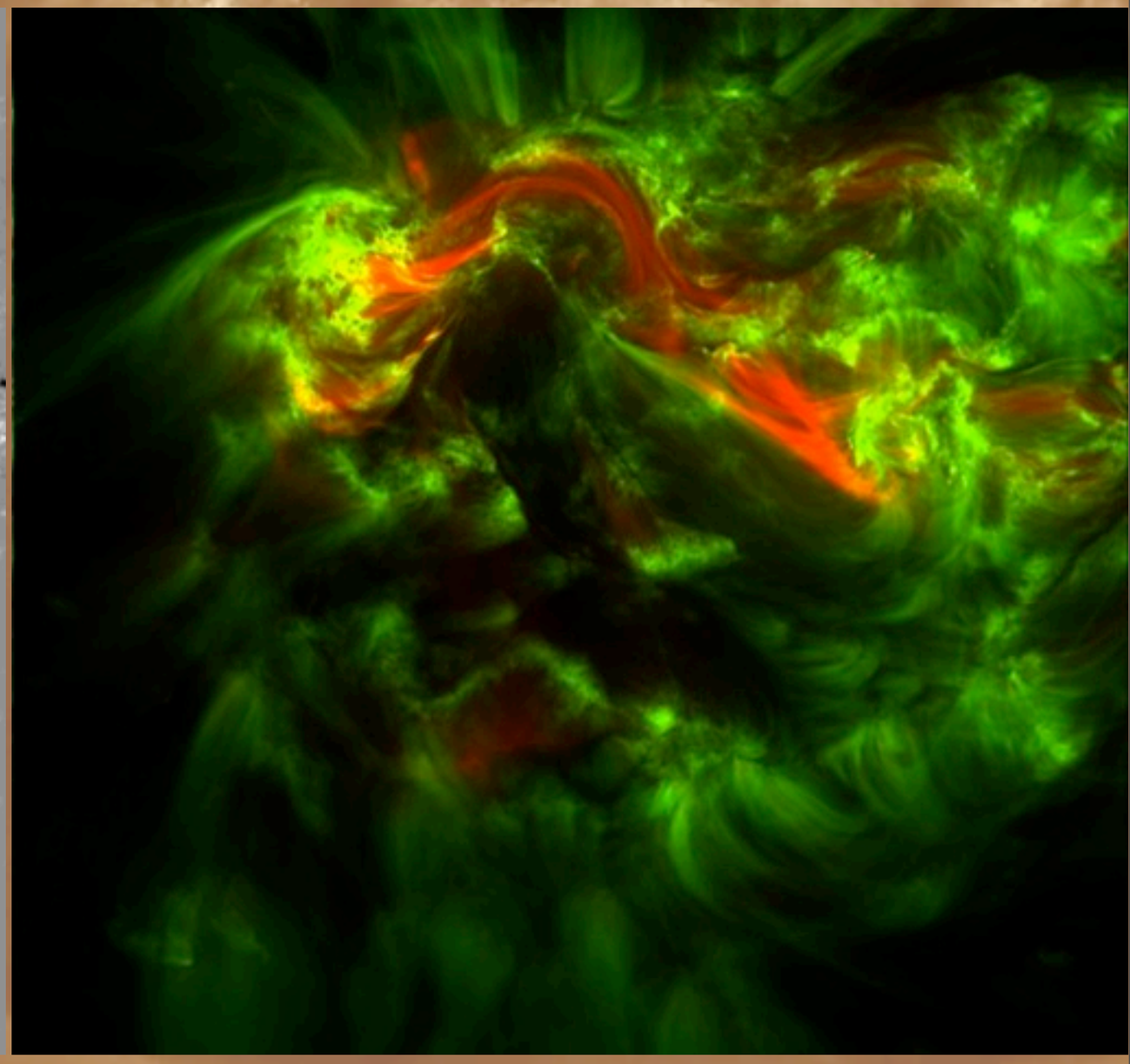
Highest-resolution, fastest-cadence EUV images taken of the corona.

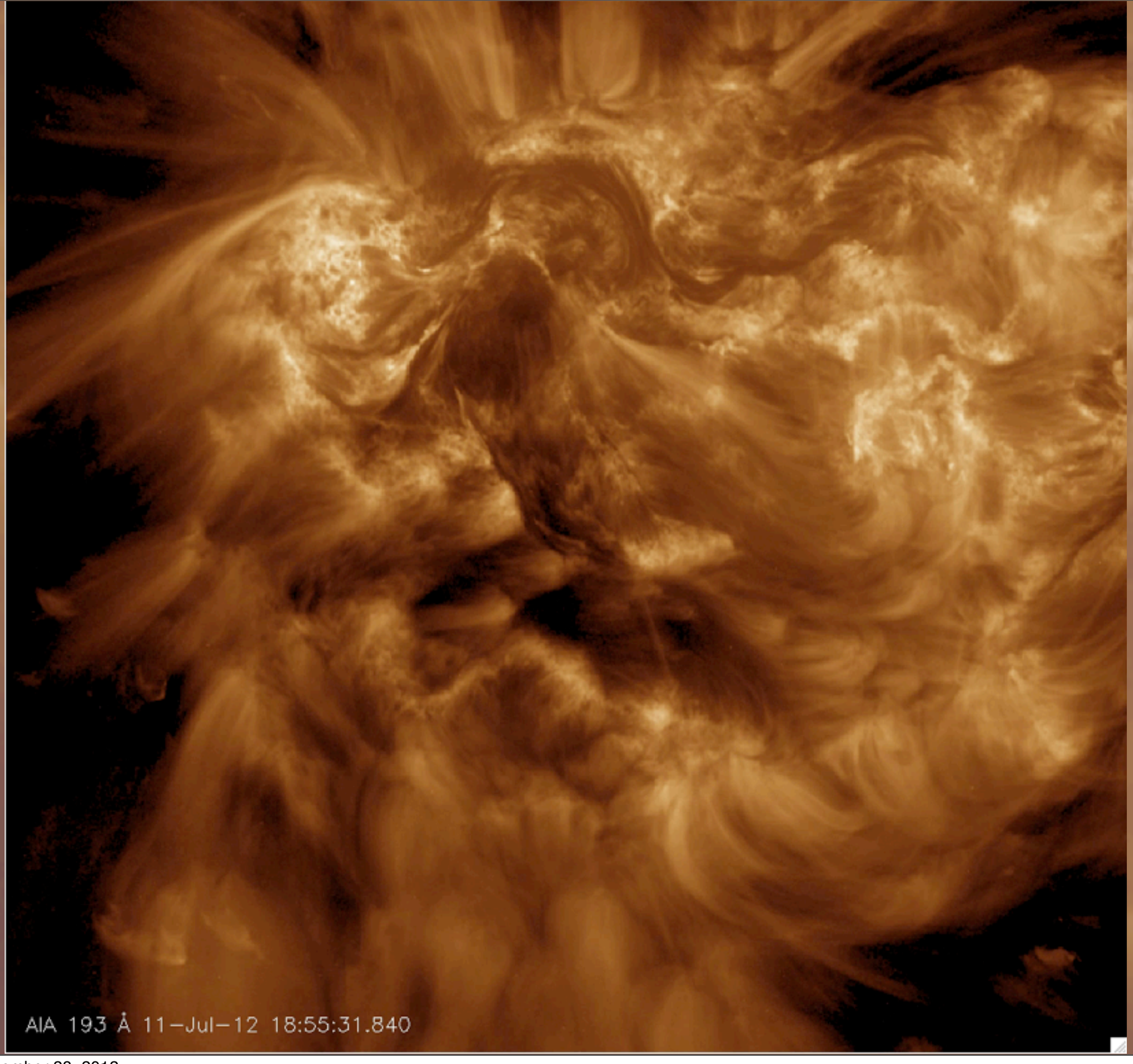
What to take away

- Hi-C reveals that loops have sub-structure below what can be resolved with AIA.
- The strands appear to be twisted.
- We may need higher resolution yet...

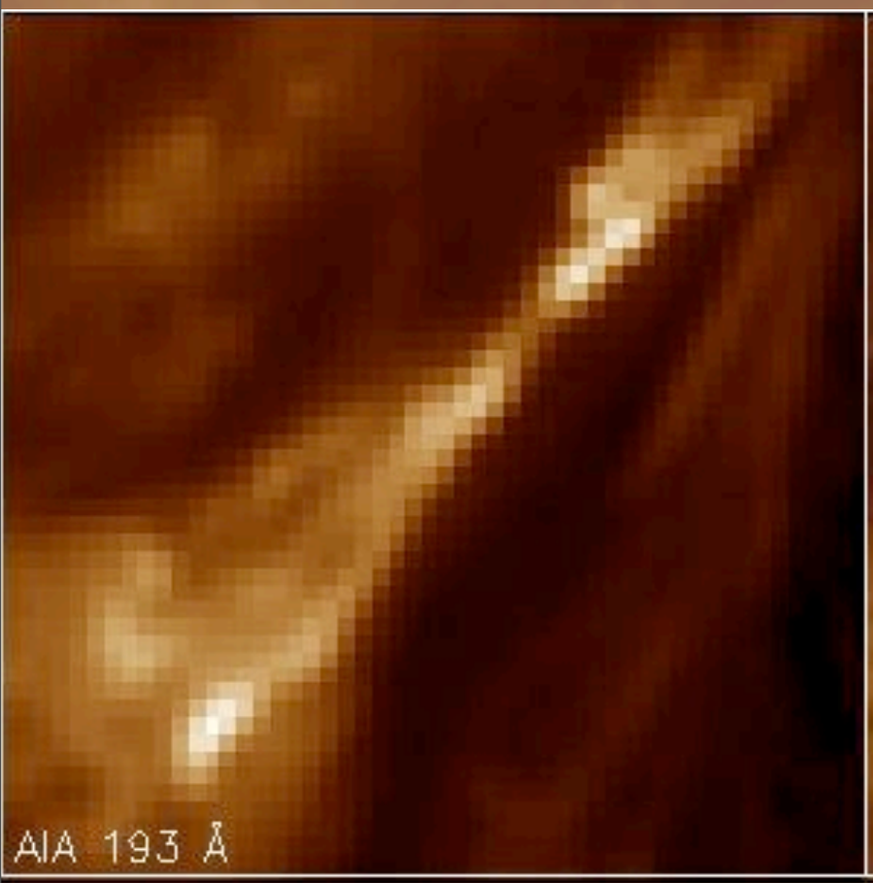
Hi-C Field of View

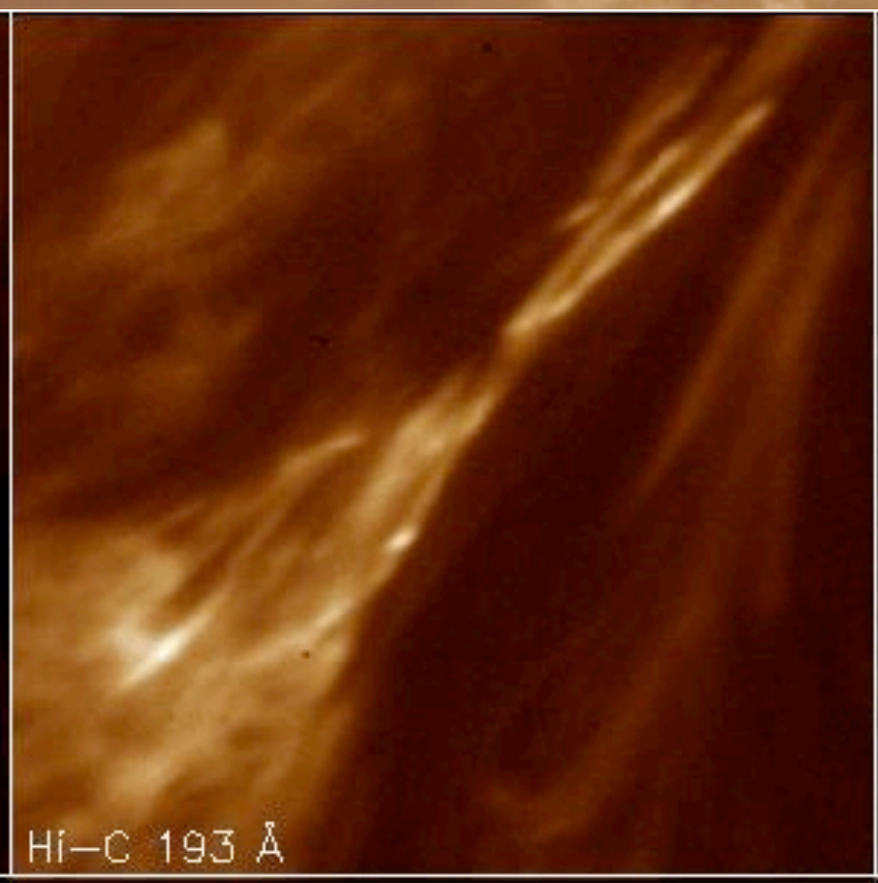





AIA 193 Å 11-Jul-12 18:55:31.840

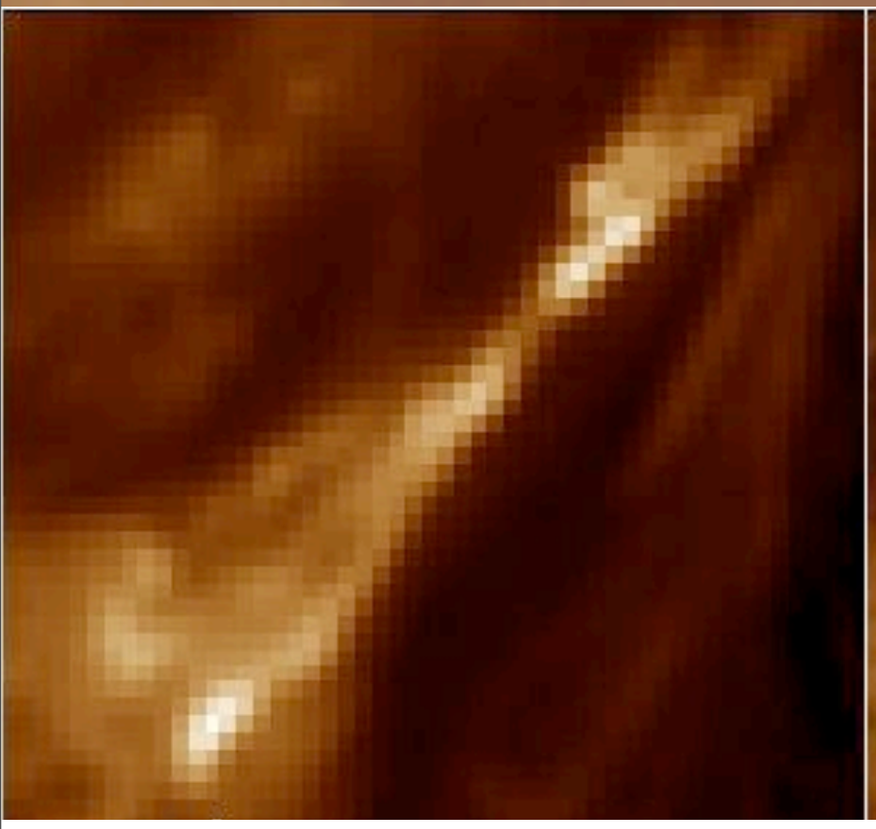
Evolving Loop

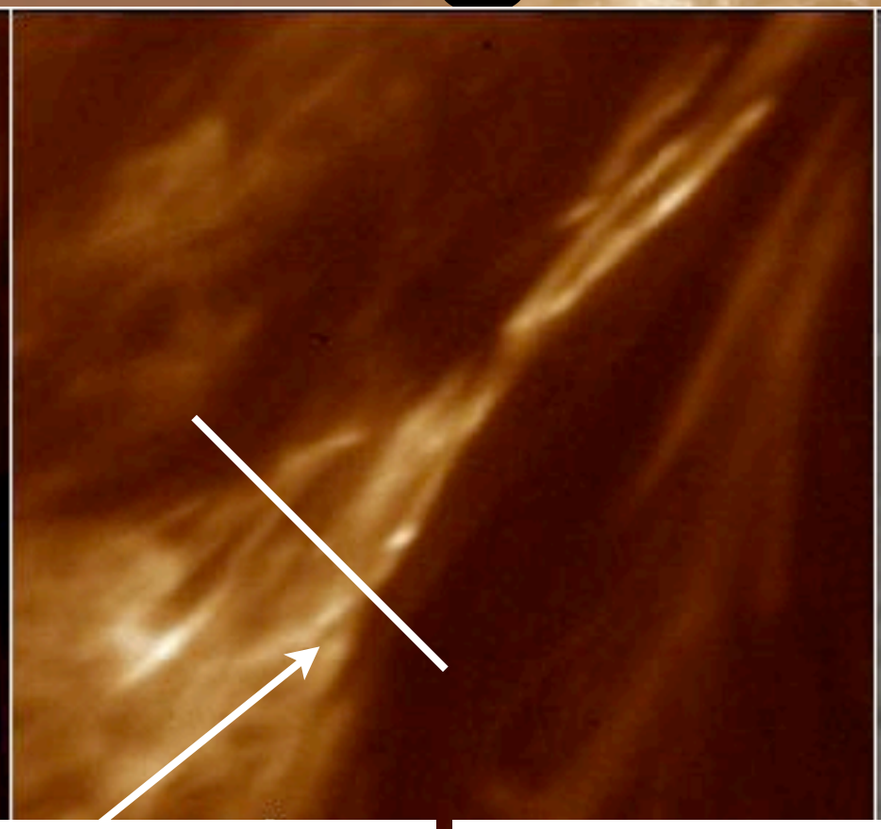


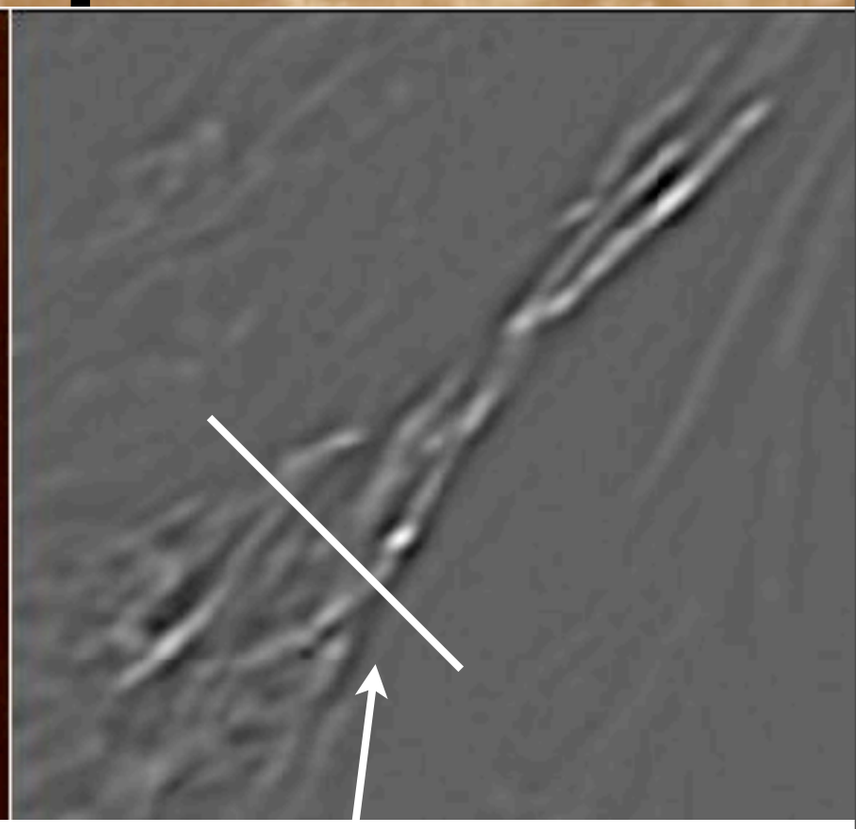


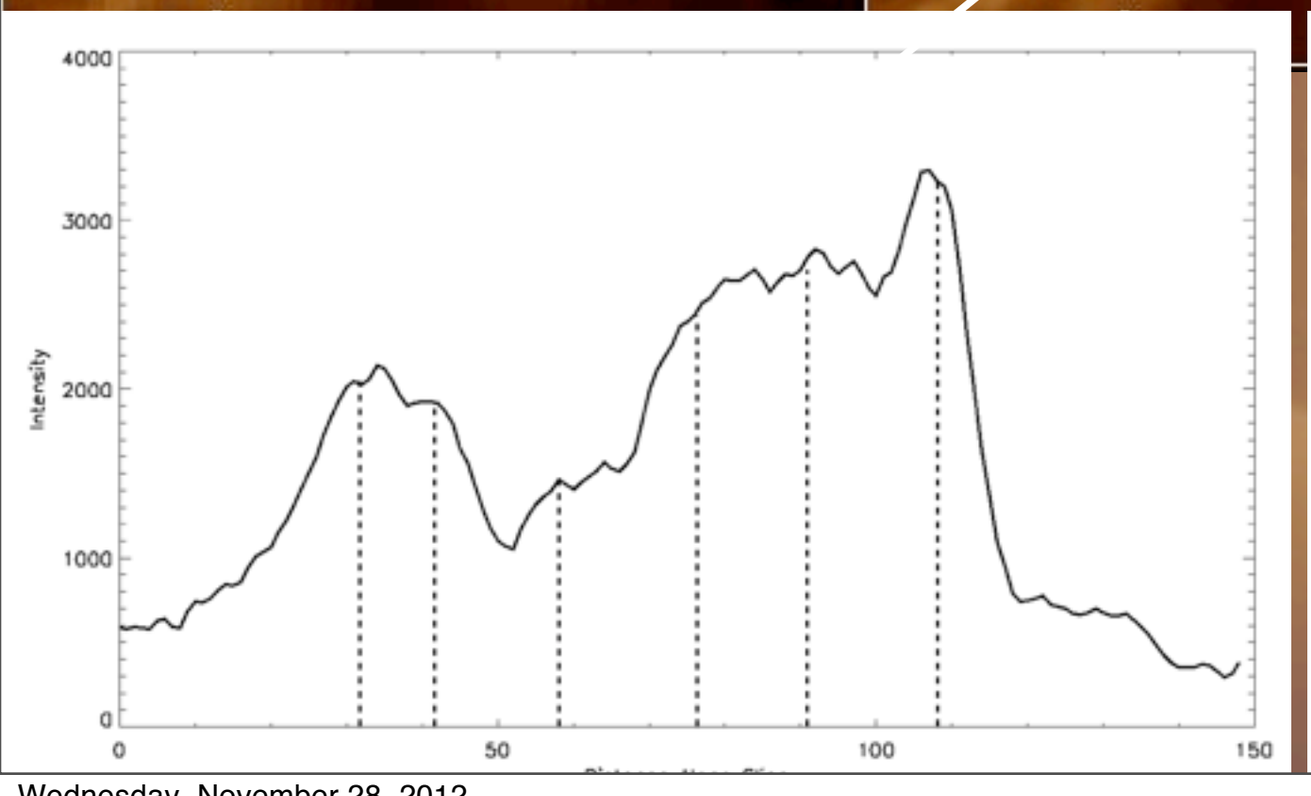
Hi-C resolves several strands wrapping around one another.

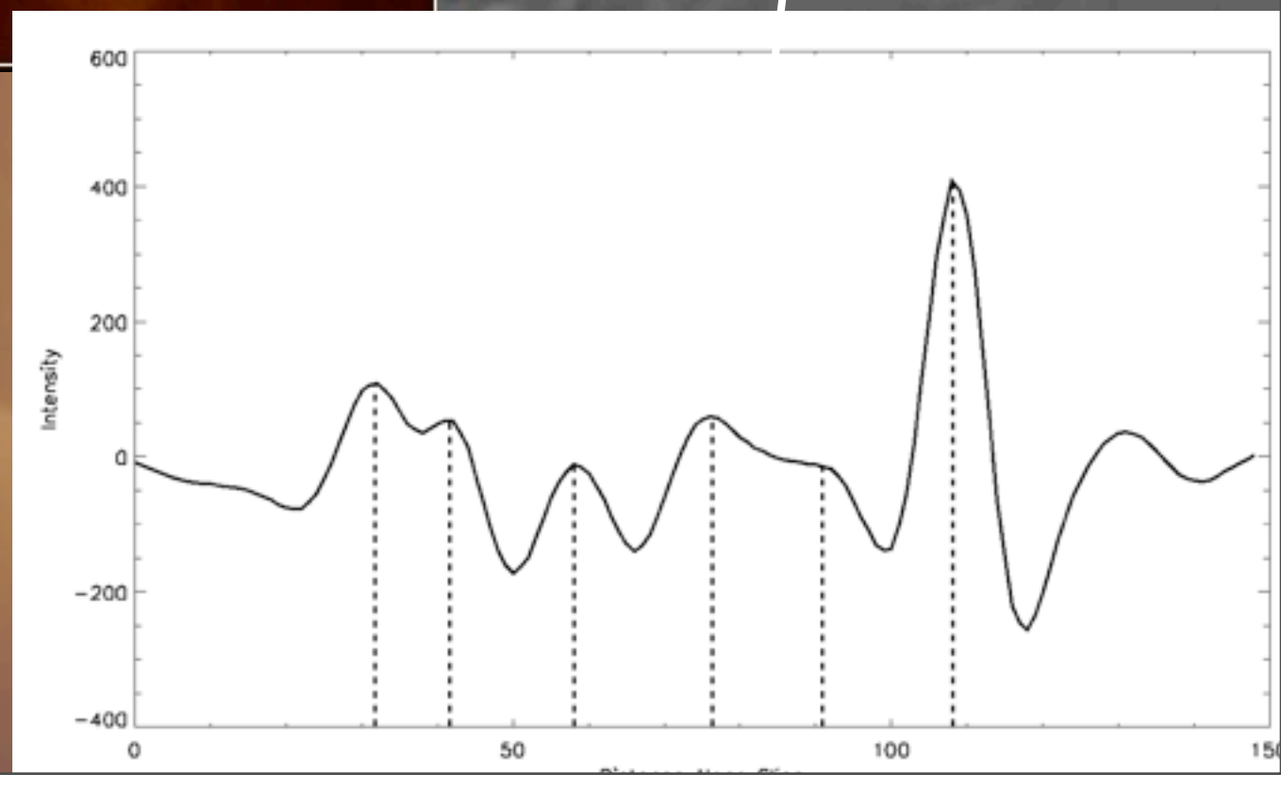
Evolving Loop



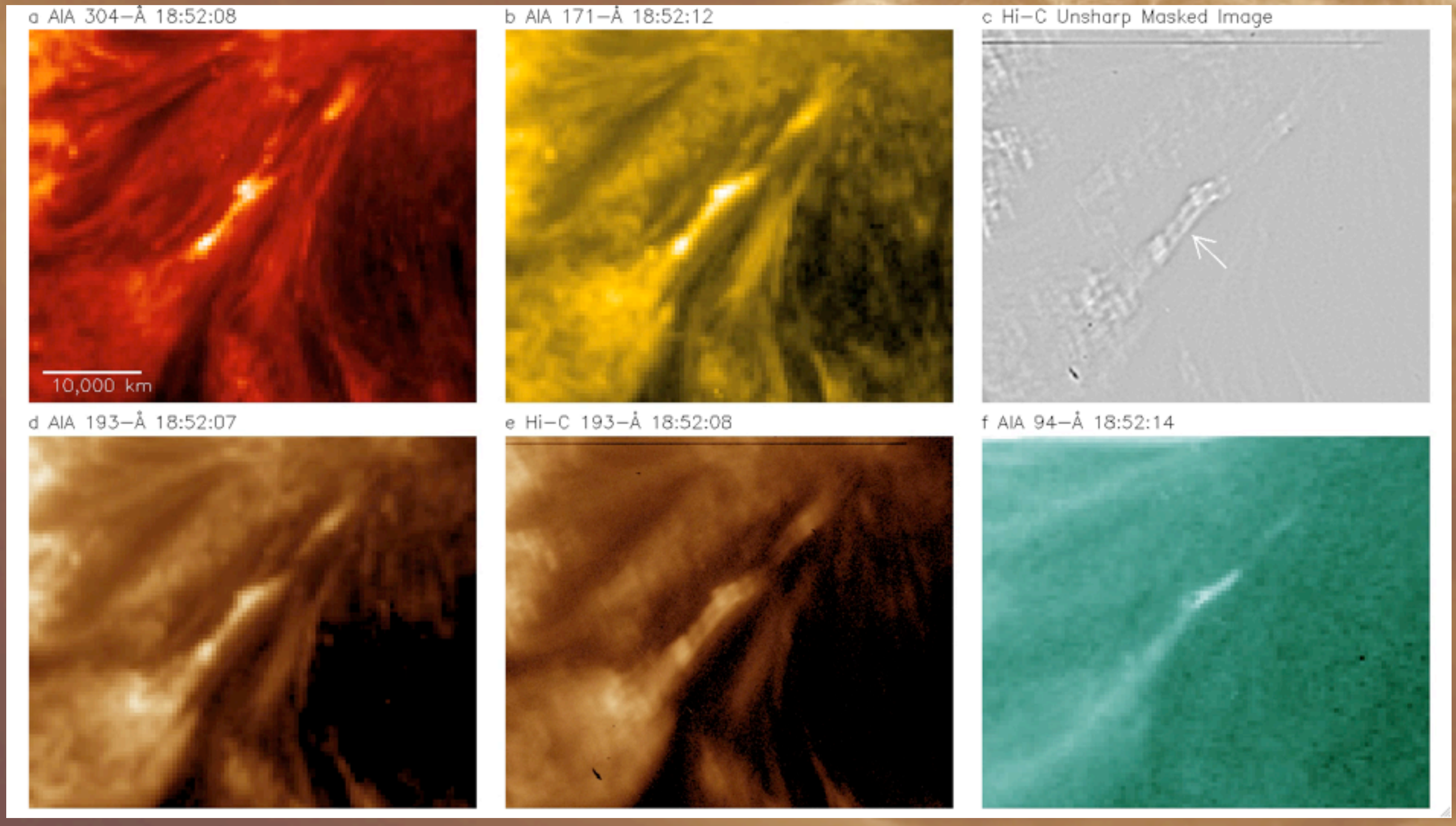






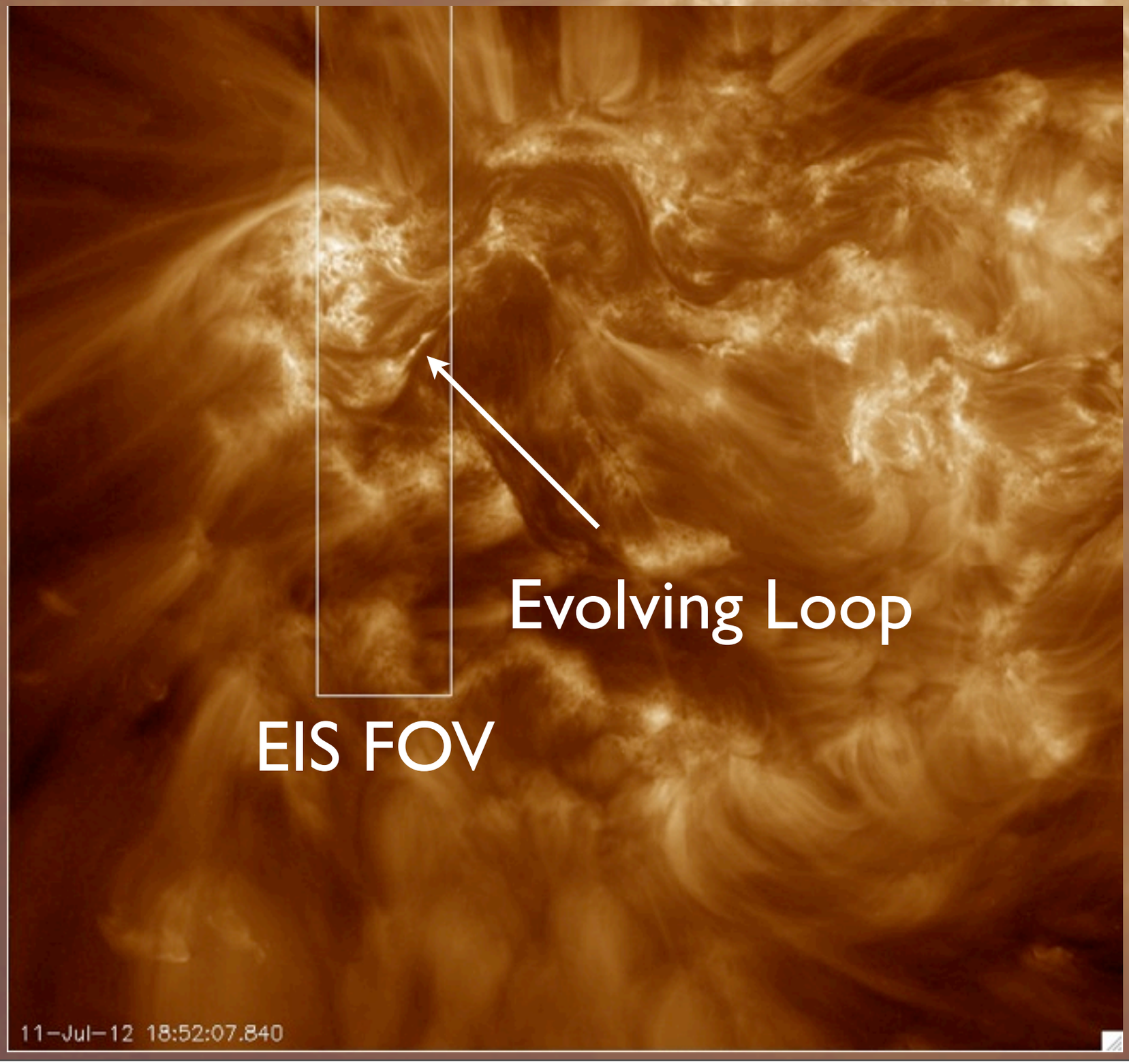


Evolving Loop



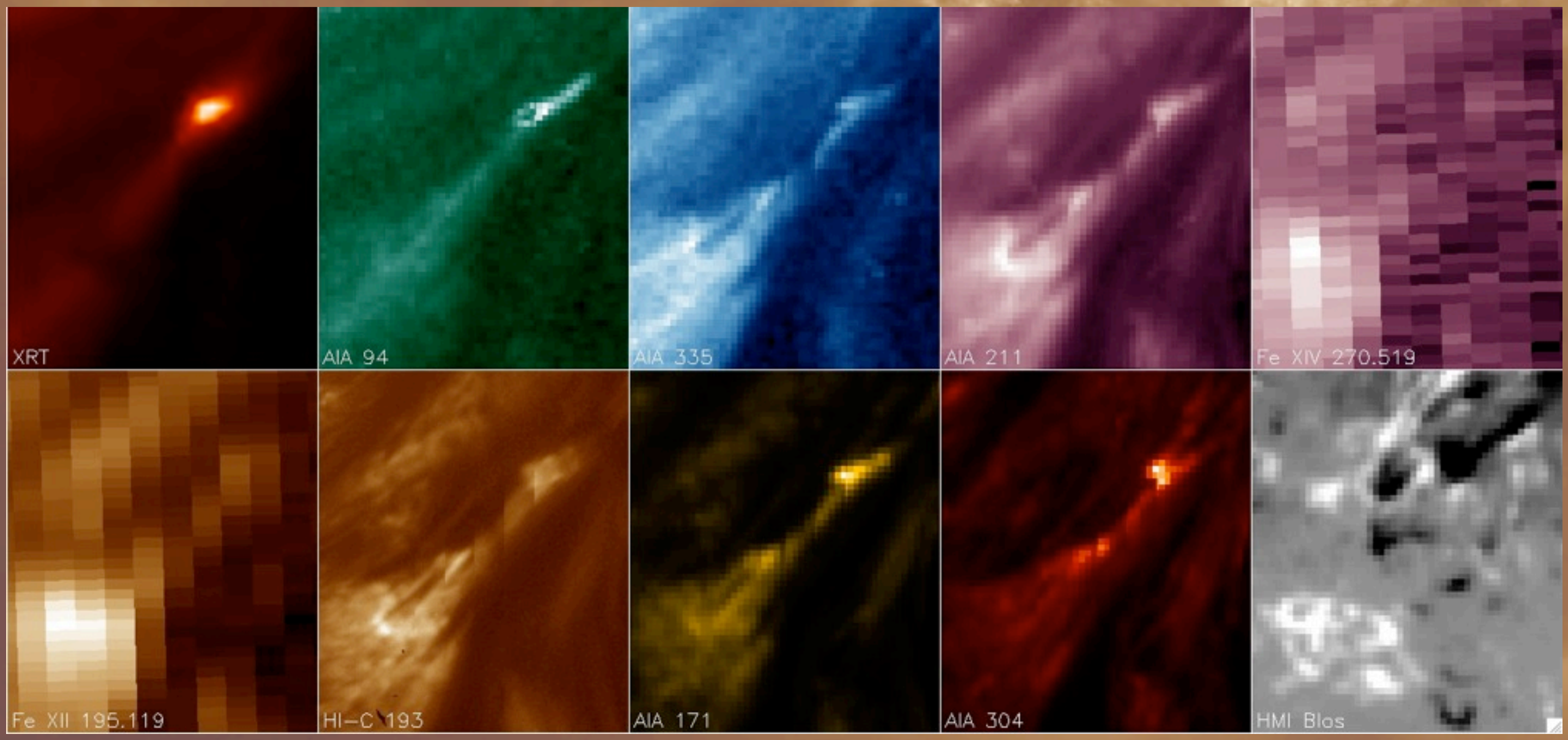
Shortly after Hi-C, an event occurred at the crossing.

Are we resolving the sub-structure?

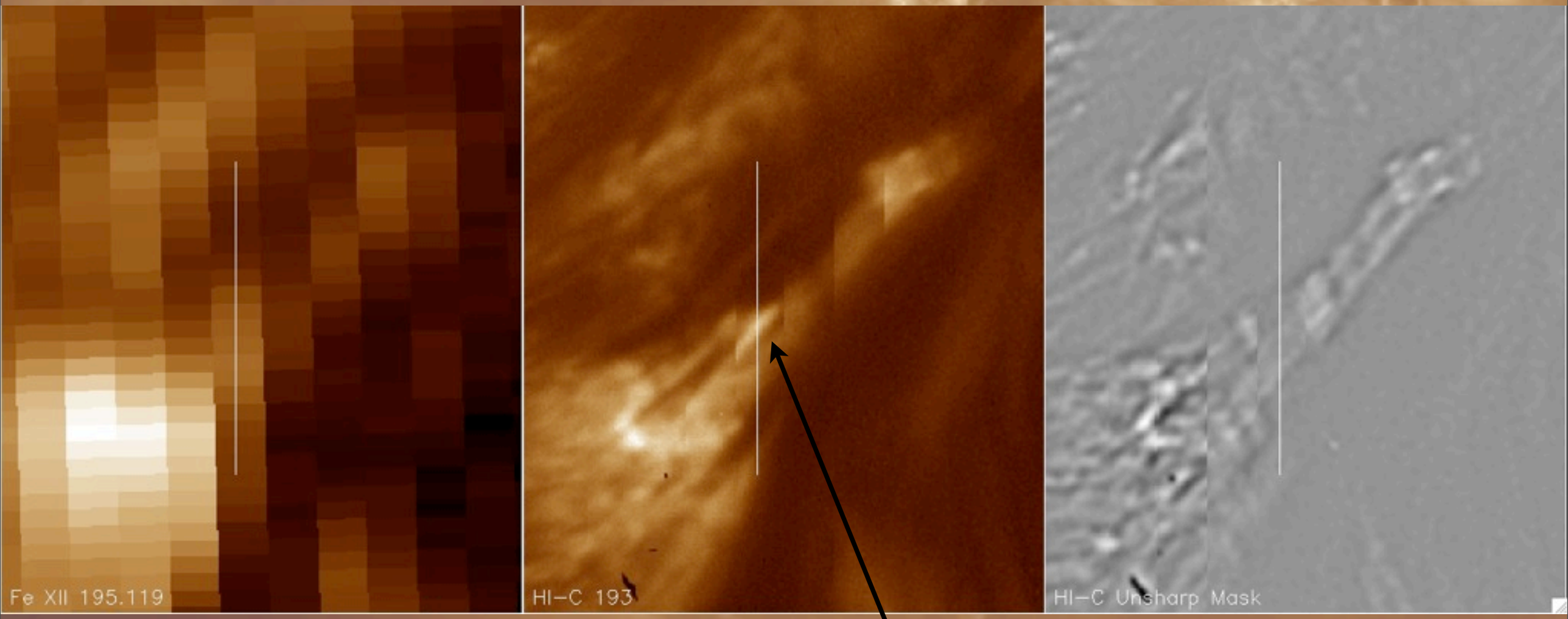


EIS, Hi-C and AIA Rasters

← time

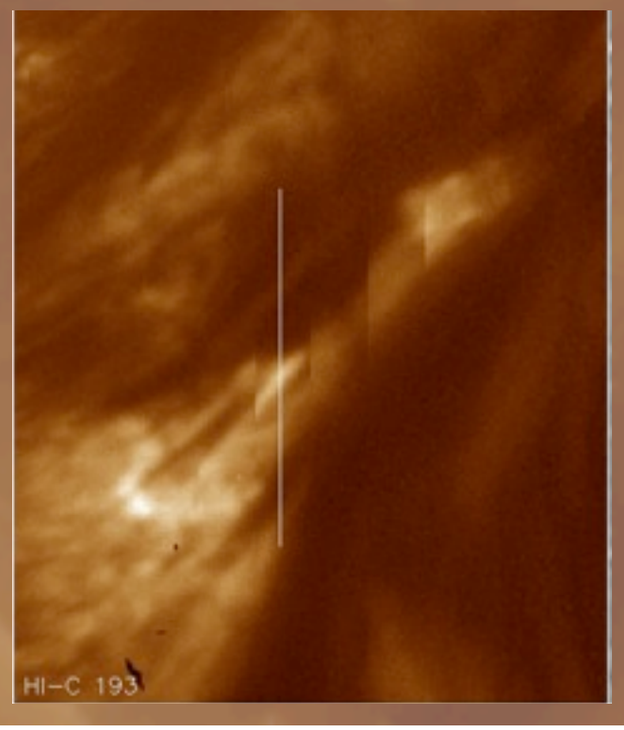


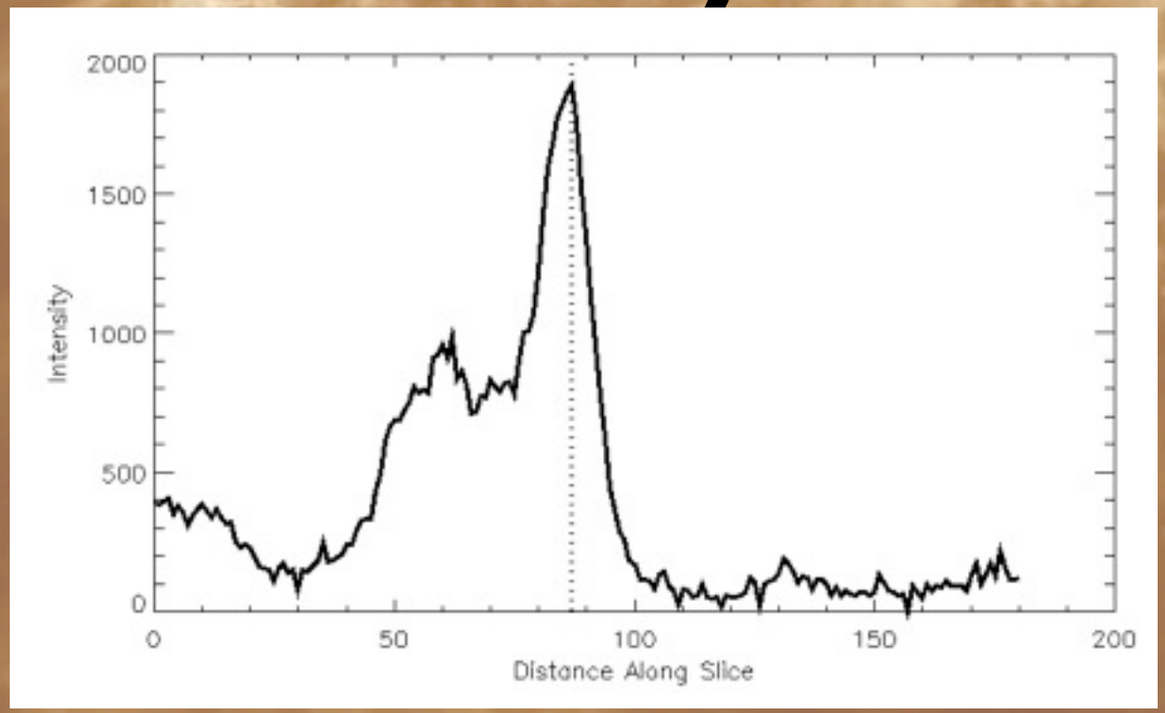
Isolate a structure

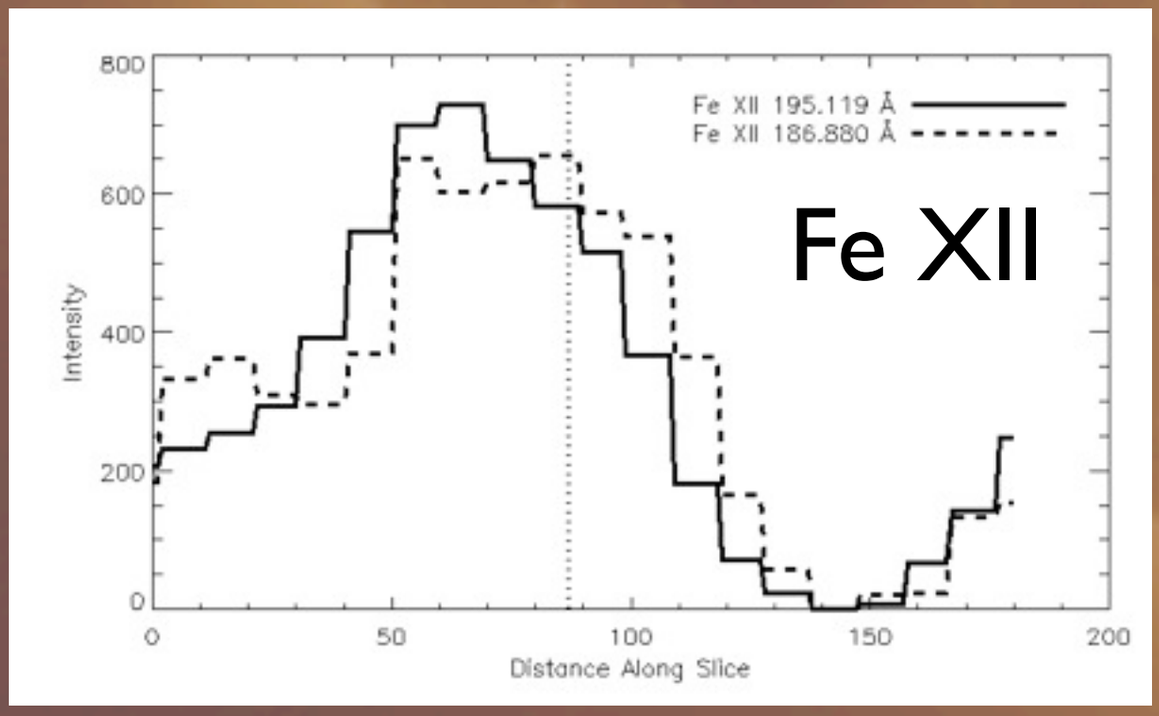


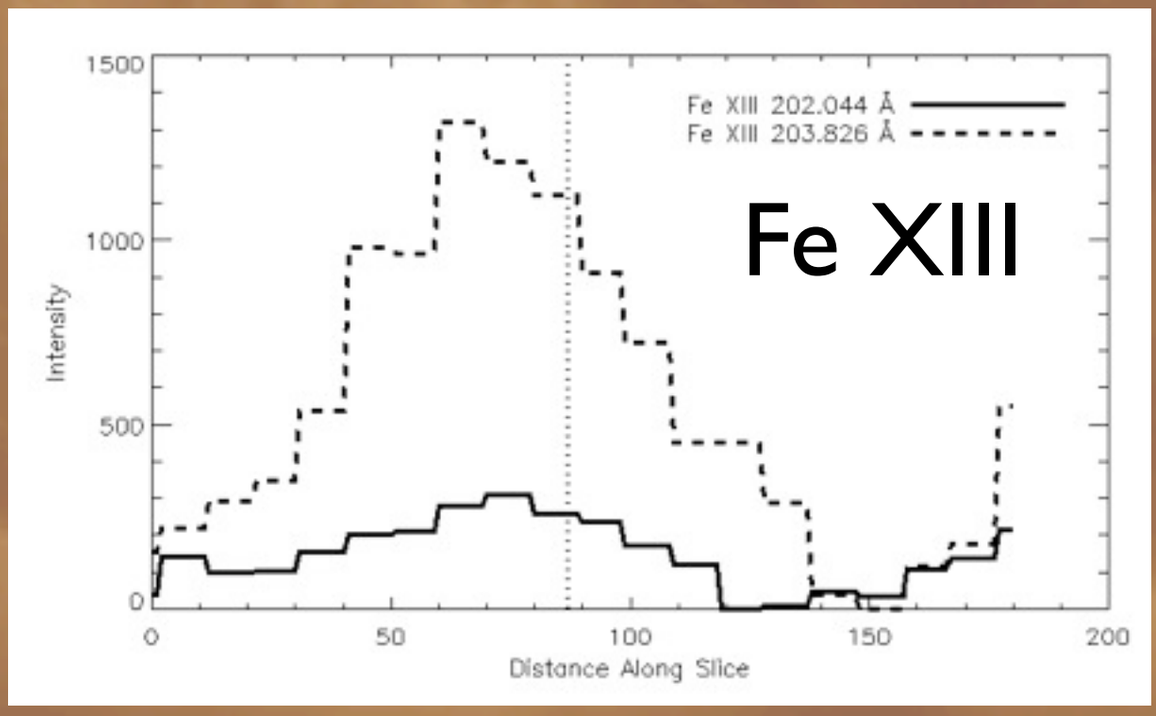
Is this structure resolved?

Calculate a density





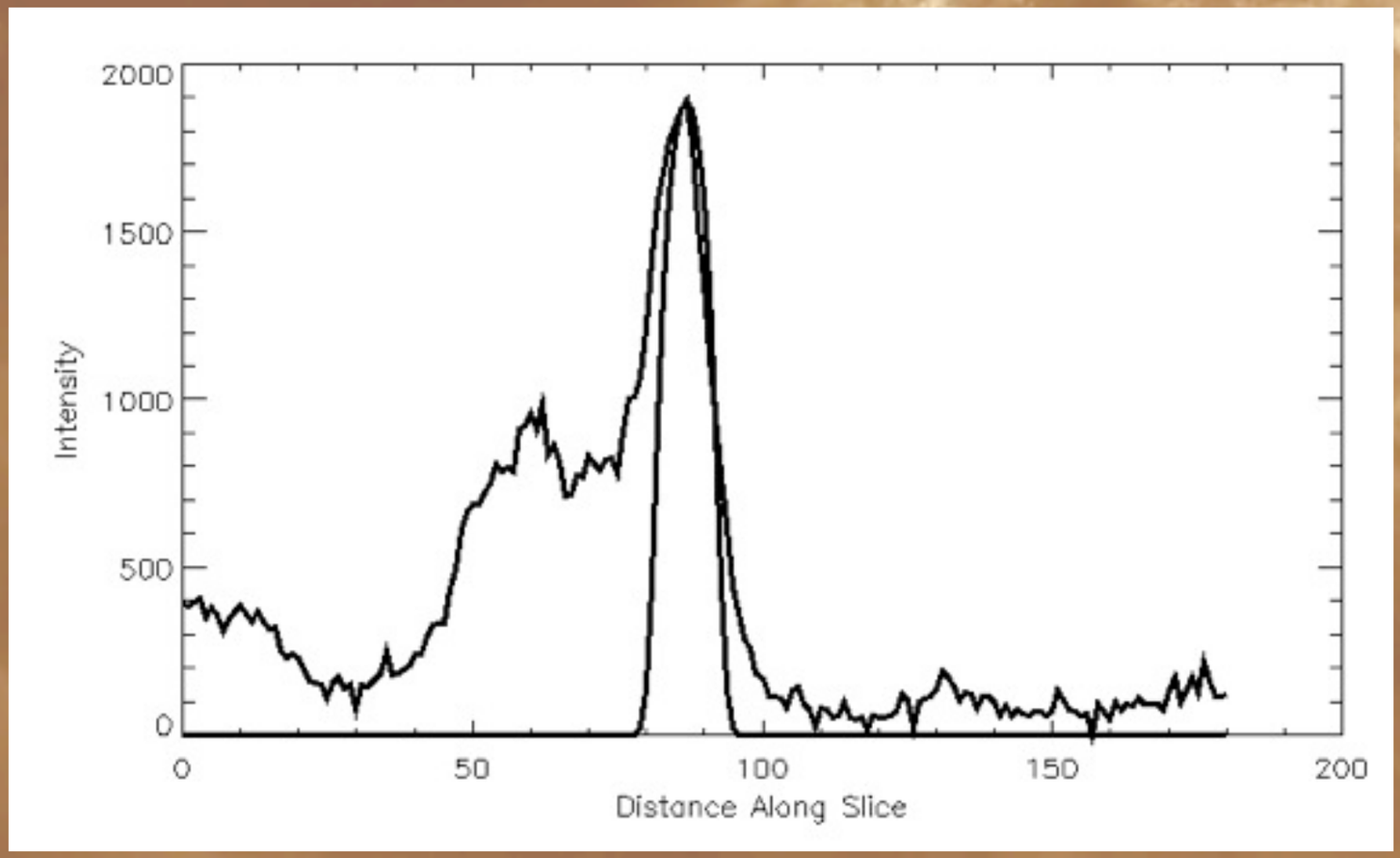




$n_e = 2\text{-}7 \times 10^{10}\ cm^{-3}$

$n_e = 0.5\text{-}6 \times 10^{10}\ cm^{-3}$

Potentially resolved



To replicate Hi-C emission:

T = 1.5 MK

Radius of structure = 435 km

$n_e = 1 \times 10^{10}$ cm^{-3}

Densities measured from EIS: 0.5-7 x 10^{10} cm^{-3}

Hi-C: A New View of the Sun

Data will be released in January.